CLAIMS

What is claimed is:

1. An absorbent structure, comprising:

at least one absorbent layer and

at least one sensing device comprising a magnetoelastic film.

2. The absorbent structure of claim 1, wherein the least one absorbent layer comprises 0-100% of superabsorbent material.

3. The absorbent structure of claim 1, wherein the at least one absorbent layer comprises at least one acquisition layer and at least one storage layer.

4. The absorbent structure of claim 1, wherein the at least one absorbent layer comprises at least one drying layer, and wherein the absorbent layer optionally comprises a plurality of individual sheets and bonding means for joining said individual sheets.

5. The absorbent structure of claim 1, wherein the magnetoelastic film oscillates with a magnetoacoustic resonant frequency after the magnetoelastic film is excited in a magnetic field and the magnetic field is switched off.

6. The absorbent structure of claim 1, wherein the at least one sensing device is 1-20 sensing device(s).

7. The absorbent structure of claim 1, wherein the magnetoelastic film is a thin film, and wherein the magnetoelastic film comprises magnetostrictive material.

8. The absorbent structure of claim 7, wherein the magnetostrictive material is a magnetoelastic material, a soft magnetoelastic material, an amorphous magnetoelastic material, or a mixture thereof.

9. The absorbent structure of claim 1, wherein the magnetoelastic film is coated with a wetness sensitive polymer selected from the group consisting of linear and hydrophilic polymers or chemically/physically cross-linked swellable polymer gels based on polyvinyl alcohol, polyvinyl pyrrolidone, polyethylene oxide and co-polymers thereof; polyurethane; polyamides; starch and derivatives thereof; cellulose and derivatives thereof; polysaccharides; proteins; polyacrylonitrile; acrylate-based polymers; and mixtures thereof.

10. The absorbent structure of claim 1, wherein the magnetoelastic film is coated directly or indirectly with at least one detector molecule adapted to detect at least one target biological and/or chemical analyte.

11. An absorbent article comprising
the absorbent structure of claim 1,
a fluid-permeable top sheet, and
an essentially fluid-impermeable bottom sheet.

12. A diaper or pants-type diaper, comprising
the absorbent structure of claim 1,
a front-part,
a back-part, and
a crotch-part between the front and back-parts.

13. The diaper pants-type diaper of claim 12, wherein the absorbent structure comprises 1-10 sensing device(s).

14. An absorbent article comprising the absorbent structure of claim 1.

15. The absorbent article of claim 14, wherein the absorbent structure comprises

5-100% cellulose fibers, wherein said cellulose fibers are mainly comprised of fibers of chemothermomechanically-produced pulp, and between 0-95% superabsorbent material,

calculated on the total weight of the structure in a dry state.

16. A sensoring absorbent system, comprising

the absorbent structure of claim 1, and

a hand held unit comprising an excitation coil generating a magnetic field to magnetize said magnetoelastic film and optionally a pick-up coil to detect the magnetoacoustic resonant frequency.

17. The sensoring absorbent system according to claim 16, wherein the hand held unit comprises the excitation coil and the pick-up coil.

18. A method for detecting wetness, moisture, or humidity, and/or at least one biological and/or chemical analyte in an absorbent structure of claim 1, comprising the steps of

a) providing an absorbent structure of claim 1,

b) applying a magnetic field,

c) exciting the magnetoelastic film in the at least one sensing device in the absorbent structure,

d) switching the magnetic field off,

e) recording magnetoacoustic resonant frequency,

f) optionally repeating step b) to e), and

g) detecting changes in the magnetoacoustic resonant frequency, so as to detect wetness, moisture, or humidity, and/or at least one biological and/or chemical analyte in the absorbent structure.

19. The method of claim 18, wherein the magnetic field is a pulsed magnetic field.

20. The method of claim 18, wherein the magnetoelastic film excited in step c) is excited by an excitation coil.

21. The method of claim 18, wherein the recording in step e) is detected by a pick-up coil.

22. The method of claim 20, wherein the excitation coil is in a hand held unit, and wherein the hand held unit is 0-5 m from the absorbing structure when exciting the magnetoelastic film in step c).

23. The method of claim 21, wherein the pick-up coil is in a hand held unit, and wherein the hand held unit is 0-5 m from the absorbent structure when recording the magnetoacoustic resonant frequency in step e).